Listing of Claims:

1-27. (cancelled)

28. (currently amended) An optical performance monitor, comprising:

~~a)~~ an optical isolator having an output optically coupled to [[a]] an input of a means for demultiplexing the input optical signals into a pre-selected number of wavelength bands, each wavelength band containing a pre-selected number of wavelength channels, the optical isolator having an input optically coupled to the input optical signals, the means for demultiplexing the optical signals having a number of outputs equal to the pre-selected number of wavelength bands with each output being optically coupled into an associated optical branching device, each optical branching device having a first circulating port being optically coupled to a first end of an associated length of optical fiber, each optical branching device having an output port optically coupled to an associated detector;

each length of optical fiber having a fiber Bragg grating array including ~~a~~ ~~pre-selected~~ the same number of spatially -separated fiber Bragg gratings, each of the ~~pre-selected number of~~ fiber Bragg gratings having a different associated Bragg wavelength, the length of optical fiber having a second end being a low reflection termination;

tuning means attached to each of the ~~pre-selected number of~~ spatially - separated fiber Bragg gratings for inducing a pre-selected amount of change in

both fiber Bragg grating period and refractive index in each fiber Bragg grating for shifting the associated Bragg wavelengths of each of the ~~pre-selected number of~~ fiber Bragg gratings among a pre-selected number (L) of positions, wherein when a pre-selected fiber Bragg grating in each length of optical fiber is switched to coincide with a pre-selected wavelength channel, the pre-selected wavelength channels in each fiber are reflected back through the optical branching device attached to each length of optical fiber and out through its output port into the associated detector connected thereto, whereupon the wavelength channels of each wavelength band are interrogated to determine pre-selected properties of the optical signals,

wherein each spatially-separated fiber Bragg grating in different optical fibers but in the same corresponding fiber positions is attached to a common tuning means such that all the fiber Bragg gratings in the same corresponding fiber positions are switched at the same time.

29. (original) An optical performance monitor according to claim 28 wherein the means for demultiplexing the input optical signals is an optical band demultiplexer.

30. (cancelled)

31. (cancelled)

32. (original) An optical performance monitor according to claim 28 wherein the pre-selected properties of the wavelength channels including wavelength channel identification, wavelength channel power and wavelength channel optical-signal-to-noise-ratio.

33. (original) An optical performance monitor according to claim 28 wherein the optical branching device is an optical circulator.

34. (original) An optical performance monitor according to claim 28 wherein the optical branching device includes an optical coupler.

35. (original) An optical performance monitor according to claim 28 wherein the detectors are individual discrete detectors.

36. (original) An optical performance monitor according to claim 28 wherein the detectors are part of a single detector-array.

37. (currently amended) An optical performance monitor according to claim 28 wherein the ~~optical band demultiplexer~~ the means for demultiplexing the input optical signals includes a fiber optic filter array including fiber optic branches with each fiber optic branch having fiber Bragg gratings, the fiber Bragg gratings in each fiber optic branch having Bragg wavelengths selected to transmit only one wavelength band at an output of each branch of the fiber optic branches, and

wherein the output of each branch is optically coupled to ~~one of~~ ~~the~~ an associated ~~detector~~ optical branching device so optical signals from each wavelength band are interrogated independently of all remaining wavelength bands.

38. (currently amended) An optical performance monitor according to claim 37 wherein the number of pre-selected number of wavelength bands is K, and wherein the fiber optic filter array includes a 1 × K optic splitter having an input connected to the output port of the optical branching device and K output branches each having all pre-selected wavelength bands routed therein, wherein each of the K output branches includes a broadband fiber Bragg grating to transmit one of the wavelength bands and reflect all remaining wavelength bands followed by a narrowband fiber Bragg grating to provide a sharp filtering edge so that substantially square zero-skipped filtering is achieved at a boundary between the transmitted wavelength band and the reflected wavelength bands, and wherein each of the K output branches is optically coupled to one of the associated ~~detector~~ optical branching device, and wherein each of the K output branches transmits a different wavelength band than all the other K output branches so that all wavelength bands are output from the optical band demultiplexer.

39. (currently amended) An optical performance monitor according to claim 37 wherein the number of pre-selected number of wavelength bands is K, and

wherein the fiber optic filter array includes multiple cascaded 1 × 2 optical splitters with an output of each 1 x 2 optical splitter connected to a broadband fiber Bragg grating followed by a narrowband fiber Bragg grating, wherein the output of each narrowband fiber Bragg grating is connected to an input of the next 1 x 2 optical splitter in the fiber optic array or to one of the associated ~~detector~~ optical branching device, wherein the total number of splitting stages is selected to give sufficient fiber optic branches so that all the pre-selected number of wavelength bands K are individually output from the fiber optic array to its associated detector.

40-67. (cancelled)

68. (currently amended) A method of monitoring optical performance of optical signals in an optical fiber, comprising the steps of:

a) demultiplexing optical signals into a pre-selected number (K) of wavelength bands, each wavelength band containing a pre-selected number of wavelength channels;

b) directing the demultiplexed wavelength channels from each of the pre-selected number (K) wavelength bands into an associated optical branching device and into ~~an~~ a length of optical fiber coupled thereto, each length of optical fiber having a fiber Bragg grating array including ~~a pre-selected number (M)~~ the same number of spatially -separated number of fiber Bragg gratings, each of the ~~pre-selected number of~~ fiber Bragg gratings having a different associated Bragg

wavelength and being tunable among a pre-selected number (L) of wavelength positions with each wavelength position coinciding with an associated pre-selected wavelength channel from the wavelength band routed into the length of optical fiber such that each fiber Bragg grating reflects its (L) pre-selected wavelength channels back through the optical branching device attached thereto, the length of optical fiber having a second end being a low reflection termination;

~~c))~~ c) tuning both the period and refractive index of one of the ~~pre-selected number (M) of~~ fiber Bragg gratings in each of the optical fibers for shifting the associated Bragg wavelength of each fiber Bragg grating to coincide with an associated pre-selected wavelength channel from the pre-selected wavelength band such that the pre-selected fiber Bragg grating reflects the associated pre-selected wavelength channel back through its associated optical branching device, and detecting the reflected pre-selected wavelength channel from each wavelength band and interrogating the detected wavelength channels to determine pre-selected properties of the optical signals contained therein;

d) repeating step c) L-1 additional times until L wavelength channels in the pre-selected wavelength band in each length of optical fiber has been reflected back through the optical branching device; and

e) repeating steps c) and d) for each of the ~~pre-selected number (M) of~~ spatially -separated Bragg gratings in each length of optical fiber until all the wavelength channels have been detected;

f) repeating steps b), c) d) and e) for each of the pre-selected number (K) of wavelength bands until all the wavelength channels (N), given by N=MKL, are detected,

<u>wherein each spatially-separated fiber Bragg grating in different optical fibers but in the same corresponding fiber positions is attached to a common tuning means such that all the fiber Bragg gratings in the same corresponding fiber positions are switched at the same time</u> .

69. (cancelled)

70. (currently amended) The method according to claim ~~88~~ <u>68</u> wherein the optical branching device is an optical circulator.

71. (original) The method according to claim 68 wherein the optical branching device is an optical coupler.

72. (original) The method according to claim 68 wherein the step of detecting is performed using individual discrete detectors.

73. (original) The method according to claim 68 wherein the step of detecting is performed using detectors which are part of a single detector-array.

74. (currently amended) [[A]] The method according to claim 68 wherein the step of demultiplexing the optical signals includes splitting and reproducing the optical signals in all the pre-selected wavelength bands in a pre-selected number of fiber optic branches, and filtering the optical signals in each of the pre-selected fiber optic branches to transmit only one of the pre-selected wavelength bands and reflect all the other pre-selected wavelength bands, wherein each fiber optic branch transmits a different pre-selected wavelength band from all the others so that each of the wavelength bands are output from the pre-selected number of fiber optic branches.

75. (currently amended) [[A]] The method according to claim 74 wherein the number of pre-selected wavelength bands is K, and wherein the fiber optic branches are formed using a 1 × K optic splitter having an input connected to an output port of the optical branching device and K output branches each having all pre-selected wavelength bands routed therein, wherein each of the K output branches includes a broadband fiber Bragg grating to transmit one of the wavelength bands and reflect all remaining wavelength bands followed by a narrowband fiber Bragg grating to provide a sharp filtering edge so that substantially square zero-skipped filtering is achieved at a boundary between the transmitted wavelength band and the reflected wavelength bands, and wherein each of the K output branches is optically coupled to one of the associated ~~detector~~ optical branching device, and wherein each of the K output branches

transmits a different wavelength band than all the other K output branches so that all wavelength bands are output from the optical band demultiplexer.

76. (currently amended) [[A]] The method according to claim 74 wherein the number of pre-selected wavelength bands is K; and wherein the fiber optic branches are formed using at least one cascaded 1 × 2 optical splitters with an output of each 1 x 2 optical splitter connected to a broadband fiber Bragg grating followed by a narrowband fiber Bragg grating, wherein the output of each narrowband fiber Bragg grating is connected an input of the next 1 x 2 optical splitter in the fiber optic array or to one of the associated detectors, wherein the total number of splitting stages is selected to give sufficient fiber optic branches so that all the pre-selected number of wavelength bands K are individually output from the fiber optic array to an associated ~~detector~~ optical branching device .

77. (new) An optical performance monitor, comprising:

an optical isolator having an output optically coupled to an input of a means for optically splitting the input optical signals, the optical isolator having an input optically coupled to the input optical signals, the means for splitting the optical signals having a number of outputs equal to a pre-selected number of wavelength bands, each wavelength band containing a pre-selected number of wavelength channels, with each output of said means for optically splitting the input optical signals being optically coupled into an associated optical branching device, each optical branching device having a first circulating port being

optically coupled to a first end of an associated length of optical fiber, each optical branching device having an output port optically coupled to an associated detector;

each length of optical fiber having a fiber Bragg grating array including the same number of spatially -separated fiber Bragg gratings, each of the fiber Bragg gratings having a different associated Bragg wavelength, the length of optical fiber having a second end being a low reflection termination;

tuning means attached to each of the spatially -separated fiber Bragg gratings for inducing a pre-selected amount of change in both fiber Bragg grating period and refractive index in each fiber Bragg grating for shifting the associated Bragg wavelengths of each of the fiber Bragg gratings among a pre-selected number (L) of positions, wherein when a pre-selected fiber Bragg grating in each length of optical fiber is switched to coincide with a pre-selected wavelength channel, the pre-selected wavelength channels in each fiber are reflected back through the optical branching device attached to each length of optical fiber and out through its output port into the associated detector connected thereto, whereupon the wavelength channels of each wavelength band are interrogated to determine pre-selected properties of the optical signals,

wherein each fiber Bragg grating has a pre-selected out-of-band rejection ratio,

and wherein each spatially-separated fiber Bragg grating in different optical fibers but in the same corresponding fiber positions is attached to a

common tuning means such that all the fiber Bragg gratings in the same corresponding fiber positions are switched at the same time.

78. (new) An optical performance monitor according to claim 77 wherein the pre-selected properties of the wavelength channels including wavelength channel identification, wavelength channel power and wavelength channel optical-signal-to-noise-ratio.

79. (new) An optical performance monitor according to claim 77 wherein the optical branching device is an optical circulator.

80. (new) An optical performance monitor according to claim 77 wherein the means for optically spitting the input signals includes an optical coupler.

81. (new) An optical performance monitor according to claim 77 wherein the detectors are individual discrete detectors.

82. (new) An optical performance monitor according to claim 77 wherein the detectors are part of a single detector-array.

83. (new) A method of monitoring optical performance of optical signals in an optical fiber, comprising the steps of:

a) optically splitting optical signals into a number of outputs equal to a pre-selected number (K) of wavelength bands, each wavelength band containing a pre-selected number of wavelength channels;

b) directing the optically splitted wavelength channels into an associated optical branching device and into a length of optical fiber coupled thereto, each length of optical fiber having a fiber Bragg grating array including the same number of spatially -separated number of fiber Bragg gratings, each of the fiber Bragg gratings having a different associated Bragg wavelength and being tunable among a pre-selected number (L) of wavelength positions with each wavelength position coinciding with an associated pre-selected wavelength channel from the wavelength band routed into the length of optical fiber such that each fiber Bragg grating reflects its (L) pre-selected wavelength channels back through the optical branching device attached thereto, the length of optical fiber having a second end being a low reflection termination;

c) tuning both the period and refractive index of one of the fiber Bragg gratings in each of the optical fibers for shifting the associated Bragg wavelength of each fiber Bragg grating to coincide with an associated pre-selected wavelength channel from the pre-selected wavelength band such that the pre-selected fiber Bragg grating reflects the associated pre-selected wavelength channel back through its associated optical branching device, and detecting the reflected pre-selected wavelength channel from each wavelength band and interrogating the detected wavelength channels to determine pre-selected properties of the optical signals contained therein;

d) repeating step c) L-1 additional times until L wavelength channels in the pre-selected wavelength band in each length of optical fiber has been reflected back through the optical branching device; and

e) repeating steps c) and d) for each of the spatially -separated Bragg gratings in each length of optical fiber until all the wavelength channels have been detected;

f) repeating steps b), c) d) and e) for each of the pre-selected number (K) of wavelength bands until all the wavelength channels (N), given by N=MKL, are detected,

wherein each spatially-separated fiber Bragg grating in different optical fibers but in the same corresponding fiber positions is attached to a common tuning means such that all the fiber Bragg gratings in the same corresponding fiber positions are switched at the same time .

84. (new) The method according to claim 83 wherein the optical branching device is an optical circulator.

85. (new) The method according to claim 83 wherein the step of optically splitting optical signals is performed using an optical coupler.

86. (new) The method according to claim 83 wherein the step of detecting is performed using individual discrete detectors.

87. (new) The method according to claim 83 wherein the step of detecting is performed using detectors which are part of a single detector-array.